IN THE CLAIMS

1. (currently amended) An actuator locatable in a **fluid** flow path, the actuator comprising:

a single substrate upon which is fabricated a membrane, a membrane activating mechanism, and an integrated circuit;

the membrane capable of moving through a first position ~~and~~ **,** a second position, **and an intermediate position,** in the first position, the membrane inhibiting **fluid** flow through the **fluid** flow path, and in the second position, the membrane enabling **fluid** flow through the **fluid** flow path**, in the intermediate position, the membrane enabling partial fluid flow through the fluid flow path**; and

the membrane activating mechanism to move the membrane between the first position ~~and~~ **,** the second position**, and an intermediate position**.

2. (original) The actuator of Claim 1, wherein the actuator is a non-electrostatic, non-thermal actuator.

3. (original) The actuator of Claim 1, wherein the actuator is an electromagnetic actuator, and the substrate is provided with an orifice.

4. (original) The actuator of Claim 1, wherein the membrane is a pre-stressed membrane, and the membrane activating mechanism includes an electromagnetic force generator;

wherein the membrane is positionable into the first position by the pre-stressed nature of the membrane;

wherein when the electromagnetic force generator generates an electromagnetic force in a first direction, the membrane is drawn into the second position; and

wherein when the electromagnetic force generator generates an electromagnetic force in a direction substantially opposite the first direction, the membrane is drawn into the first position.

5. (previously presented) The actuator of Claim 4, wherein the membrane is stable in both the first and the second positions without an induced electromagnetic force from the electromagnetic force generator.

6. (previously presented) The actuator of Claim 1, wherein the membrane is a convex membrane, and the membrane activating mechanism includes an electromagnetic force generator;

wherein the membrane is positionable into the first position by the convex nature of the membrane;

wherein when the electromagnetic force generator generates an electromagnetic force in a first direction, the membrane is drawn into the second position; and

wherein when the electromagnetic force generator generates an electromagnetic force in a direction substantially opposite the first direction, the membrane is drawn into the first position.

7. (previously presented) The actuator of Claim 6, wherein the membrane is stable in both the first and the second positions without an induced electromagnetic force from the electromagnetic force generator.

8. (previously presented) The actuator of Claim 1, wherein the membrane activating mechanism includes an electromagnetic force generator and a permanent magnet, the membrane located between the electromagnetic force generator and the permanent magnet;

wherein when the electromagnetic force generator generates a force in a direction substantially in the same direction as the force of the permanent magnet, the membrane is drawn into the first position; and

wherein when the electromagnetic force generator generates a force in a direction substantially in an opposite direction as the force of the permanent magnet, the membrane is drawn into the second position.

9. (previously presented) The actuator of Claim 8, wherein the membrane is stable in both the first and the second positions without an induced electromagnetic force from the electromagnetic force generator.

10. (original) The actuator of Claim 1, wherein the actuator has an energy consumption of 400mW or less to fully actuate.

11. (original) The actuator of Claim 1, wherein the actuator fully actuates in less than or equal to .36 seconds.

12. (currently amended) An actuator for an integrated circuit, the actuator locatable in a **fluid** flow path, the actuator comprising:

a single substrate upon which is fabricated a membrane and a membrane activating mechanism;

the membrane capable of moving through a first position ~~and~~ , a second position, **and an intermediate position,** in the first position, the membrane inhibiting **fluid** flow through the **fluid**

flow path, and in the second position, the membrane enabling **fluid** flow through the **fluid** flow path**, in the intermediate position, the membrane enabling partial fluid flow through the fluid flow path**; and

the membrane activating mechanism to move the membrane between the first position ~~and ,~~ the second position**, and an intermediate position**;

the membrane selected from the group consisting of a pre-stressed membrane, a convex membrane, a torsional membrane providing for rotational movement of the membrane between the first and second positions, a membrane having a dome portion, and a membrane having a dome portion and legs.

13. (previously presented) The actuator of Claim 12, wherein the single substrate is CMOS compatible.

14. (previously presented) The actuator of Claim 12, wherein the actuator is an electromagnetic microvalve;

wherein the single substrate has an orifice;

wherein the membrane activating mechanism includes a magnet and at least one coil;

wherein when the at least one coil generates a force in a direction substantially in the same direction as the force of the magnet, the membrane is drawn into the first position; and

wherein when the at least one coil generates a force in a direction substantially in an opposite direction as the force of the magnet, the membrane is drawn into the second position.

15. (previously presented) The actuator of Claim 14, wherein the membrane is stable in both the first and the second positions without an induced electromagnetic force from the at least one coil.

16. (original) The actuator of Claim 15, wherein the substrate has a first face and a second face; and

wherein the magnet is a permanent magnet in communication with the first face of the substrate.

17. (original) The actuator of Claim 16, wherein a high permeability material with a high magnetic field saturation is provided between at least one coil turn of the at least one coil.

18-20. (canceled).

21. (currently amended) An electromagnetic actuator locatable in a **fluid** flow path, the actuator comprising:

a single substrate upon which is fabricated a membrane and a membrane activating mechanism, the substrate provided with an orifice;

the membrane capable of moving through a first position ~~and~~ **,** a second position, **and an intermediate position,** in the first position, the membrane inhibiting **fluid** flow through the **fluid** flow path, and in the second position, the membrane enabling **fluid** flow through the **fluid** flow path**, in the intermediate position, the membrane enabling partial fluid flow through the fluid flow path**; and

the membrane activating mechanism to move the membrane between the first position ~~and~~ **,** the second position**, and an intermediate position**;

wherein the membrane is a convex membrane, and the membrane activating mechanism includes an electromagnetic force generator;

wherein the membrane is positionable into the first position by the convex nature of the membrane;

wherein when the electromagnetic force generator generates an electromagnetic force in a first direction, the membrane is drawn into the second position;

wherein when the electromagnetic force generator generates an electromagnetic force in a direction substantially opposite the first direction, the membrane is drawn into the first position; and

wherein the membrane is stable in both the first and the second positions without an induced electromagnetic force from the electromagnetic force generator.